The Prevalence of Detectable Blood Alcohol Concentration among Unnatural Deaths in Northern Thailand

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Background: *Alcohol is the most common substance abused. It causes many kinds of injuries and death from accidents, homicides, suicides and sudden unexplained natural death (SUND). Traffic accidents especially, have a very close correlation with alcohol concentration levels in the body.*
Material and Method: *In the present study, there were 1,138 corpses who were sent for autopsy at Chiang Mai University from January to December 2003, in which 78.4% of these cases suffered unnatural death.*
Results: *The incidence of accident was 64.7%, homicide was 22.3% and suicide was 13%. The authors used 153 corpses as a sample. In the sample, 74 (48.4%) were from traffic injuries. There was Blood Alcohol Concentration (BAC) detected in 82 (53.6%) of them, and 99% were male. Their age range was 26-35 years in 42.7% of cases, the employees constituted 48%, 57% were married, 52.4% had traffic injuries for a total of 54.9% who experienced accidental death. The BACs in the accident deaths were very high, with 67 (81.7%) having blood alcohol concentrations of more than 50 mg, 58 (70.7%) with more than 100 mg% and only 15 (18.3%) with less than 50 mg%. The highest BAC detected was 396 mg% in a case that did not die of alcohol toxicity. The most common range of BAC in these cases was 151-200 mg% in 20.7% of cases.*
Conclusion: *Alcohol is one of the most common associations with unnatural death in Thailand. From the present study the authors found alcohol associated with drugs such as diazepam and chlorpheniramine etc.*

Keywords: *SUND, Alcohol, Accident, Homicide, Suicide, Diazepam, Chlorpheniramine*

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Alcoholic consumption has been accepted worldwide since the Roman and Greek times. However, at certain levels it can change behavior, coordination of muscles and consciousness. This, in turn, can cause accident related death. The authors found that the correlation between alcohol concentration (65%) and traffic accidents from 1985 to 1989 was 62.2% in Chiang Mai[1], and 39.6% in Siriraj Hospital, Bangkok[2]. In the United States, more than 20,000 persons have died annually of alcohol abuse since 1984, especially in the age range of 15-45 years. In 1998, 15,936 people were killed in alcohol-related traffic crashes in the USA. These deaths constituted approximately 38.4% of the 41,471 traffic fatalities[3].

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Alcohol or ethanol is a small hydrophilic molecule that is rapidly absorbed from the gastrointestinal tract or alveoli and distributed to organs such as the brain, lungs, kidneys, etc. It oxidizes to acetaldehyde, carbondioxide, and water at a rate of 100-110 mg/kg/hour[4]. Ethanol interacts with many kinds of drug[5]. It causes hypnotic effects when taken with sedatives, antihistamines, cyclic antidepressants, phenothiazines, barbiturates and benzodiazepines[6]. It also increases the chances of traffic accidents that lead to morbidity and mortality everywhere in the world.

Material and Method

All 153 corpses in the present study were whole body who suffered unnatural death and did not receive any prior treatment from northern Thailand. They were sent by the police in Chiang Mai, Chiang Rai, Lumphun, Lumpang, MaeHong Sorn, Payow, Prare,

Narn, Audtaradid, Tak and Sukothai from January to December 2003. The authors did autopsies to find out the causes and manner of death at the Department of Forensic Medicine, Chiang Mai University. Femoral blood was taken from the corpses and preserved with NaF anticoagulant at 4°C in a refrigerator.

Gas Chromatography Headspace was performed to detect blood alcohol concentrations every other day for a week. The results are shown as percentage.

Results

For sample corpses, 153 were collected from the 1,138 corpses received from January to December 2003. The general data are demonstrated in Table 1.

From January to December 2003, 153 corpses from 892 unnatural deaths were sent to Maharaj Nakorn Chiang Mai Hospital to be examined. Eighty two (53.6%) had Blood Alcohol Concentration (BAC) detected. The male to female ratio was 81:1. The age range was 15-78 years and the mean age was 34 years. The most common age range was 26-30 years (24.4%). Employees accounted for the most common occupation (50%) and students were the least common occupation (8.5%). The married were 57.3% while 42.7% were single. However, traffic accidents produced the most common injuries (52.4%) and were significantly higher than the other causes of death, especially gunshot wounds (18.3%). The least number of assaults were blunt injury, poisoning and other causes of death. Most of the corpses (54.9%) died from an accident, while 26.8% were from homicide and 13.4% from suicide. There were associated substances in nine corpses (11%) with BAC; one diphenhydramine, two pindoral, one trimetroprim, one chlorpheniramine, one clindamycin, one mithamidophos, one diazepam and one ephedrine.

The BAC ranged from 5% to 396 mg%, with the two most common ranges being 151-200 mg% (20.7%) and 301-396 mg% (19.5%). The ratio of < 50 mg% to > 50 mg% of BACs was 1:4.5 (Table2)

The BAC causing a deterioration of consciousness is more than 150mg% (56.1%). There was high prevalence between high BACs (> 150 mg%) with traffic injuries, accounting for 27 corpses (32.9%) and from accidents, accounting for 28 corpses (34.2%), but low prevalence with homicides for which there were 9 corpses (10.9%) and for suicides there were 6 corpses (7.3%) (Table 2).

Discussion

The overall incidence of accidental death was 64.7% in unnatural deaths from January to December 2003. The male, age range (26-35 years) and employee (50%) were the most common, and the same as in other studies[1]. High BAC, more than 150 mg%, was highly prevalent, nearly 2 times among those who died from accidents and traffic injuries. No significant difference in BAC was found among those who died from GSW and homicides. However, the higher BAC increased the mortality rate in traffic injuries, especially in males and employees, although the age range and family status varied. Accident and traffic injuries increased in the BAC group of 151-200 mg% and >300 mg%, and were significantly higher than in the other groups ($p < 0.01$). There was a high prevalence of accident and traffic injuries in the BAC > 50 mg% group.

Associated substances or drugs may cause additive or synergistic effects with alcohol, thus creating a greater number of accidents and injuries. Diazepam, chlorpheniramine, ephedrine, etc. affect the central nervous system to make the victim somnolent.

Alcohol is an addictive substance consumed freely around the world. The reason for this tolerance is unknown, especially as alcoholism is so difficult to treat, and remains one of the biggest problems for mankind. This study of death with BACs of more than 80 mg% was the most common finding in Thailand and in line with the USA[3]. Thai people drink a lot of alcohol and their BACs are now significantly higher.

Table 1. The general data in this study

Death	Number (%)	892 unnatural deaths			
Total	1,138 (100%)	153 (17.2%) Samples			
- Natural	246 (21.6%)	Manner of death		BACs detection	
- Unnatural	892 (78.4%)	Traffic accident	Others	Detectable	Undetectable
Accident	577 (64.7%)	= 74 (48.4%)	= 79 (51.6%)	= 82 (53.6 %)	= 71 (46.4%)
Homicide	199 (22.3%)				
Suicide	116 (13.0%)				

Table 2. Demographic characteristics from groups of detectable BACs in 82 corpses

	Number of corpses with BAC (mg%)								Total (%)
	< 50	51-80	81-100	101-150	151-200	201-250	251-300	> 301	
Sex									
male	15	4	4	12	17	8	5	16	81 (99.8%)
female	0	0	1	0	0	0	0	0	1 (1.2%)
Age (years)									
15-20	1	1	2	0	4	0	0	0	8 (9.8)
21-25	0	1	2	0	3	0	0	1	7 (8.5)
26-30	3	1	1	5	1	2	2	5	20 (24.4)
31-35	2	0	0	2	2	4	3	2	15 (18.3)
36-40	1	1	0	0	0	1	0	4	7 (8.5)
41-45	3	0	0	0	5	0	0	2	10 (12.2)
46-50	1	0	0	5	0	0	0	2	8 (9.8)
51-78	4	0	0	0	2	1	0	0	7 (8.5)
	Number of corpses with BAC (mg%)								Total (%)
	< 50	51-80	81-100	101-150	151-200	201-250	251-300	> 301	
Occupation									
employee	9	2	2	5	3	7	4	9	41 (50.0)
official	1	0	1	2	5	0	0	4	13 (15.9)
business	2	1	0	2	4	1	0	2	12 (14.6)
student	0	1	2	0	3	0	0	1	7 (8.5)
unknown	3	0	0	3	2	0	1	0	9 (11.0)
Status									
married	9	2	2	6	7	5	5	11	47 (57.3)
single	6	2	3	6	10	3	0	5	35 (42.7)
Causes of Death (COD)									
TI	6	2	2	6	10	4	4	9	43 (52.4)
GSW	4	1	0	5	2	2	1	0	15 (18.3)
asphyxia	2	0	0	0	2	0	0	3	7 (8.5)
stab	1	0	1	0	0	0	0	4	6 (7.3)
blunt	0	0	2	1	0	0	0	0	3 (3.7)
poison	0	1	0	0	2	0	0	0	3 (3.7)
others	2	0	0	0	1	2	0	0	5 (6.1)
Manner of Death (MOD)									
accident	7	2	2	6	10	4	4	10	45 (54.9)
homicide	5	1	3	4	2	2	1	4	22 (26.8)
suicide	2	1	0	2	4	0	0	2	11 (13.4)
undetermine	1	0	0	0	1	2	0	0	4 (4.9)
No. of corpse in each group of BAC (%)	15 (18.3)	4 (4.9)	5 (6.1)	12 (14.6)	17 (20.7)	8 (9.8)	5 (6.1)	16 (19.5)	82 (100)
% of corpses with BAC	18.3				81.7				100.0

COD = cause of death, TI = traffic injury, GSW = gunshot wound, MOD = manner of death

However, Thai women drink little alcohol and rarely cause traffic accidents. This might be due to Thai culture that looks down on drunken women.

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อุบัติการณ์การตรวจพบความเข้มข้นแอลกอฮอล์ในเลือดของผู้ที่เสียชีวิตโดยผิดธรรมชาติในภาคเหนือของประเทศไทย

สิริพันธ์ ณรงค์ชัย, ไพฑูรย์ ณรงค์ชัย

แอลกอฮอล์เป็นสาเหตุพบบ่อยที่สุดที่ทำให้เกิดภยันตรายและเสียชีวิตจากอุบัติเหตุ การฆาตกรรม การฆ่าตัวตายและการตายอย่างกะทันหันและไม่คาดคิด โดยเฉพาะอุบัติเหตุจราจรซึ่งพบว่าความเข้มข้นแอลกอฮอล์ในเลือดมีความสัมพันธ์อย่างใกล้ชิดกับการเกิดอุบัติเหตุจราจร ในการศึกษานี้ศึกษาในศพที่ตายโดยผิดธรรมชาติที่ถูกส่งมาตรวจชันสูตรที่ภาควิชานิติเวชศาสตร์ มหาวิทยาลัยเชียงใหม่ ระหว่าง มกราคม ถึง ธันวาคม พ.ศ. 2547 จำนวน 1,138 ศพ ในจำนวนนี้เป็นศพที่เสียชีวิตโดยผิดธรรมชาติหลังจากที่มีการชันสูตรพลิกศพแล้ว คิดเป็นร้อยละ 78.4 ซึ่งเกิดจากอุบัติเหตุ ร้อยละ 64.7, การฆาตกรรม ร้อยละ 22.3 และ การฆ่าตัวตาย ร้อยละ 13.0 ตามลำดับ จากการศึกษาโดยการคัดเลือกตัวอย่างเพื่อทำการศึกษาแบบสุ่ม จำนวน 153 ศพ พบว่าความเข้มข้นของ แอลกอฮอล์ในเลือดของผู้ที่เสียชีวิตโดยอุบัติเหตุจราจร 74 ราย (ร้อยละ 48.4) คิดเป็นร้อยละ 90.2 ของจำนวนที่ตรวจพบแอลกอฮอล์ทั้งหมด 82 ราย (ร้อยละ 53.6) จากศพทั้งหมด 1,138 ศพ ในจำนวนนี้เป็นเพศชายถึงร้อยละ 99 ช่วงอายุที่พบมากที่สุด คือ 26-35 ปีจำนวนร้อยละ 42.7 อาชีพรับจ้างจำนวนร้อยละ 48 แต่งงานแล้วร้อยละ 57.3 พบว่าเสียชีวิตจากการบาดเจ็บจากจราจรร้อยละ 52.4 และมีพฤติกรรมการตายในลักษณะอุบัติเหตุ ร้อยละ 54.9 ส่วนความเข้มข้นแอลกอฮอล์ในเลือดของผู้ตายในการศึกษาครั้งนี้มีความเข้มข้นสูงมาก โดยพบว่าความเข้มข้นแอลกอฮอล์ในเลือดเกินกว่า 50 มิลลิกรัมเปอร์เซ็นต์จำนวนร้อยละ 81.7 ความเข้มข้นมากกว่า 100 มิลลิกรัมเปอร์เซ็นต์พบร้อยละ 70.7 และความเข้มข้นน้อยกว่า 50 มิลลิกรัมเปอร์เซ็นต์จำนวนร้อยละ 18.3 และพบว่าความเข้มข้นแอลกอฮอล์ในเลือด 151-200 มิลลิกรัมเปอร์เซ็นต์พบบ่อยที่สุดจำนวนร้อยละ 20.7 ในการศึกษาครั้งนี้ตรวจพบระดับแอลกอฮอล์ในเลือดสูงที่สุด คือ 396 มิลลิกรัมเปอร์เซ็นต์ แต่เสียชีวิตจากสาเหตุอื่นที่ไม่ใช่เกิดจากพิษของแอลกอฮอล์ จากการศึกษาดังกล่าวจะพบว่าแอลกอฮอล์เป็นปัญหาที่สำคัญที่สุด ที่ทำให้เกิดการสูญเสียอย่างรุนแรง ข้อมูลดังกล่าวในการศึกษาจะเป็นประโยชน์ในการป้องกันและลดการเสียชีวิตจากอุบัติเหตุและการฆาตกรรมต่อไป นอกจากนี้แอลกอฮอล์ยังมีการออกฤทธิ์เสริมกับยาที่ใช้รักษาโรคหลายชนิด ได้แก่ ไดอะซีแปม, คลอเฟนนิรามีน เป็นต้น อาจทำให้เกิดอุบัติเหตุขณะขับขี่รถยนต์และรถจักรยานยนต์